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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/895,250	07/02/2001	William P. Niedringhaus	MR1735-44	7717

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EXAMINER	
CHOI, PETER H	

ART UNIT	PAPER NUMBER
3623	

DATE MAILED: 10/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/895,250	NIEDRINGHAUS, WILLIAM P.	
	Examiner	Art Unit	
	Peter Choi	3623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 July 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 July 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☒ Other: *See Continuation Sheet*.

Continuation of Attachment(s) 6). Other: 37 CFR § 1.105 - Requirement for Information

DETAILED ACTION

1. Claims 1-15 are pending in the application.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claim 1, 2, 4, 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Niedringhaus' "An Agent-Based Model of the Airline Industry" (reference 1-U).

As per claim 1, Niedringhaus teaches a method of simulating the economics of airlines, comprising the steps of:

providing processing **(computer)** means;

establishing an agent-based air carrier service evolution model **(ACSEM)** and processing said ACSEM on said processing means through the steps of:

(a) entering information concerning bankrupt airlines, newly created airports **(input information on a set of airports to model in detail; AIRPORT_OFFICE:**

initiate service at an airport not previously served), and financial conditions at each airline [Section 2.1, Section 3.2];

(b) individually setting and modifying at least one of the following parameters according to a desired profit for each airline:

fees per airline and per origin-destination **(costs of owning/operating aircraft of various types, fares; BUSI_FARE and LEIS_FARE: adjusting business/leisure fares for each airline and origin-destination served)** [Section 2.1, Section 3.1];

aircraft size **(capacity; RESIZE: adjust the number of seats for each aircraft)** per airline, per aircraft [Section 2.2, Section 3.1];

scheduled departure per airline **(scheduled itineraries, and arrival/departure times; DEPART_TIME: adjust scheduled depart time, for each leg of each aircraft's itinerary)**, per aircraft, per departure [Section 2.1, Section 3.1];

fraction of seats reserved for business **(BUSI_FRAC: adjust the fraction of seats reserved for business passengers for each leg of each aircraft's itinerary)**, per airline, per itinerary leg [Section 3.1]; and

cycles around itinerary, per airline, per aircraft **(scheduled itineraries, arrival/departure times for a set of airlines and their aircraft)**; [Section 2.1]

(c) simulating at least one of the following conditions and modifying said at least one condition according to a predetermined profit margin of each airline:

sell aircraft **(AC_BUY)** [Section 3.2];

buy aircraft **(AC_SELL)** [Section 3.2];

shorten itinerary **(CHANGE_ITINERARY)** [Section 3.2]; and

lengthen itinerary **(CHANGE_ITINERARY)** [Section 3.2];

(e) for each airline, including said newly established airline, determining scheduled flights available to fly from a point of departure to a point of destination **(listing ways for passengers to travel for each origin-destination airport pair; SCHEDULE_SWAP: consider moving arrival of an aircraft ahead of departure of another aircraft to allow for a passenger transfer)**; [Section 2.3, Section 3.1]

(f) for each said airline, including said newly established airline, entering information concerning passenger demand **(demand function between each airport-pair, for two types of passenger {leisure and business})** [Section 2.1];

(g) entering information concerning leisure passengers and business passengers **(Leisure and Business Passengers]** [Section 2.5];

(h) cyclically simulating a day's traffic at predetermined time intervals for each of said airlines **(Simulating a Day of Air Traffic)** and each of said aircraft [Section 2.7], comprising the steps of:

requesting what is the state of the aircraft **(delayed flights; on-time vs. late arrivals)** [Sections 2.7, 2.8];

exercising a simulated action in accordance with the state of the aircraft **(lost revenue due to late passengers or missed connections)** [Sections 2.7, 2.8]; and

repeating said steps of the simulating a day's traffic, each predetermined period of time **(the airline reinforces/intensifies/extends certain actions {raise fares, buy more aircraft} if it has a positive result and reverse/retracts certain actions {lower fares, avoid buying aircraft} if it has a negative result; each tool typically must be run several times consecutively, enough to spot and exploit any trends)** [Section 3, Section 3.1]; and

(i) repeating the steps a-h in sequence to maximize profit of the airline **(the airline reinforces/intensifies/extends certain actions {raise fares, buy more aircraft} if it has a positive result and reverse/retracts certain actions {lower fares, avoid buying aircraft} if it has a negative result; each tool typically must be run several times consecutively, enough to spot and exploit any trends)** [Section 3, Section 3.1].

As per element (d), Niedringhaus teaches the step of inputting information pertaining to an airline. Niedringhaus does not expressly entering information concerning a newly established airline; however, these differences are only found in the non-functional descriptive material and are not functionally involved in the steps recited nor do they alter the recited structural elements. The recited method steps would be performed the same regardless of the specific data. Further, the structural elements remain the same regardless of the specific data. Thus, this descriptive material will not distinguish the claimed invention from the prior art in terms of patentability, *see In re*

Gulack, 703 F.2d 1381, 1385, 217 USPQ 401, 404 (Fed. Cir. 1983); In re Lowry, 32 F.3d 1579, 32 USPQ2d 1031 (Fed. Cir. 1994); MPEP ∋ 2106.

Furthermore, regardless of the status of the airline (newly established or not), the information for all airlines would be entered the same way. Thus, Niedringhaus teaches the limitation of the claim.

As per claim 2, Niedringhaus teaches the method of claim 1, further including the steps of:

before the step (a), entering in said processing means information concerning current airline structure **(inputting information on general economic conditions, a set of airports to model, peripheral regions to model, demand function between each airport-pair {for leisure and business passengers}, costs of owning/operating aircraft, starting schedule)** [Section 2.1].

As per claim 4, Niedringhaus teaches the method of claim 1, wherein the step (a), said information concerning newly created airports includes anticipation parameters **(demand function for each airport-pair, for leisure and business passengers; costs of owning/operating aircraft {at each airport})** [Section 2.1]

As per claim 5, Niedringhaus teaches the method of claim 1, wherein the step (a), said information concerning financial conditions **(general economic conditions,**

such as interest rates and availability of venture capital) at each airline includes information on opportunity to sell airport offices and aircrafts **(buy or sell aircraft)** [Section 2.1, Section 3.2].

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 3, 6-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Niedringhaus.

As per claim 3, Niedringhaus teaches the method of claim 1, wherein the step (a), said information concerning airports includes place **(airport capacity, population served, and peripheral regions)** [Section 2.1].

Niedringhaus does not explicitly teach the step of inputting information regarding the date of establishment of the airport. However, it is old and well known in the art that the relationship between an airline and airport impacts the placement and number of an airline's terminals on the tarmac. One such factor in this relationship is the strength and

length of relationship between the airline and airport (i.e., Atlanta's Hartsfield Airport has served a central hub airport to Delta Airlines and AirTran airlines; Phoenix SkyHarbor Airport has served as one of AmericaWest's central hub airports, etc.). Combining this factor with a demographic profile of the servicing region of the airport would result in a measure of impact of that airport to an airline's profit. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the teachings of Niedringhaus to include the date of airport establishment, because it would enable simulation of operations of an airport that accurately reflect the strength of relationship with an airline, and the customers serviced by the airport.

As per claim 6, Niedringhaus does not explicitly teach the method of claim 1, wherein steps (b) and (c), modifying of each of said parameters and each of said conditions is performed individually while holding the other of said parameters constant.

However, Official Notice is taken that attributes and/or parameter settings of a simulation model can be changed to represent different strategies, and simulated events of different attribute settings may result in improved performance. Thus, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the teachings of Niedringhaus to modify a single parameter at a time to obtain the old and well known scientific benefit of revealing the strategic impact of a single factor in the performance of the simulated model by modifying a single experimental factor, while holding all remaining factors constant, acting as a control.

As per claim 7, Niedringhaus does not explicitly teach the method of claim 1, wherein the step (f), the information concerning passenger demand is entered as explicit data.

Official Notice is taken that passenger demand data may be explicitly entered into a simulation model as parameter settings (i.e., 40% of travelers are business travelers, 60% are leisure travelers; travel on Sundays are 20% higher than travel on Wednesdays; etc.) or raw data (i.e., 64 passengers on Flight 234 to LAX at 7 AM, 234 passengers on Flight 654 to ATL at 5PM, etc.). It would have been obvious to one of ordinary skill in the art at the time of invention to modify the teachings of Niedringhaus to enter passenger demand as explicit data in order to accurately map the date, time, passenger type, flight, and destination and origin airports of all airline passengers when constructing a simulation model of an airline's operations, which results in realistic and accurate simulation results.

As per claim 8, Niedringhaus does not explicitly teach the method of claim 1, wherein the step (f), the information concerning passenger demand is generated by said processing means in accordance with a predetermined statistical model.

However, Official Notice is taken that statistical models are applied to raw data in order to reveal patterns and trends (i.e., 40% of customers are business travelers, travel

is 20% higher on Sundays than Wednesdays, etc.). Thus, it would have been obvious to one of ordinary skill in the art to modify the teachings of Niedringhaus to include the step of generating passenger demand according to a predetermined statistical model, in order to accurately reflect passenger demand, which in turn provides realistic and accurate simulation results.

As per claim 9, Niedringhaus does not explicitly teach the method of claim 1, wherein said step (h), said states of the aircraft include:

boarding;

request take-off;

take-off;

enroute;

request landing;

landing; and

idle.

Official Notice is taken that these aircraft states are old and well-known in the airline arts; thus, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the teachings of Niedringhaus to include basic aircraft status states in order to accurately simulate an action corresponding to each aircraft status state that impacts profitability and also simulating air traffic, along with the financial ramifications corresponding with resulting flight delays and/or cancellations.

As per claim 10, Niedringhaus does not explicitly teach the method of claim 9, wherein said step of requesting the state of the aircraft is repeated each minute.

However, Official Notice is taken that air traffic controllers are constantly monitoring the status of aircraft (air traffic of aircraft on the tarmac for arrivals and departures, aircraft in the air enroute to their destination, etc.) and maintain radio contact in order to monitor for unplanned circumstances (changes in weather patterns, mechanical problems, etc.). Furthermore, the frequency of status inquiry may be established as a parameter or setting of the simulation model.

Thus, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the teachings of Niedringhaus to update the state of the aircraft every minute in order to obtain accurate and up-to-date information on the status of an airline's aircraft, in order to simulate the impact of aircraft status (delayed and/or canceled flights, paying passengers boarding flights, etc.) to an airline's economic status and provide instant feedback and support for any unplanned circumstances (what to do in case of mechanical problems, how to re-route the flight to avoid complex weather systems, unexpected heavy traffic on the tarmac making it impossible to land as planned, etc.).

As per claims 11-15, Niedringhaus does not explicitly teach the steps of:

simulating actions of the "boarding" state, including boarding of passengers with tickets of this flight;

simulating actions of the "request take-off" state, including granting take-off depending on capacity of the airport and demand;

simulating actions of the "take-off" state, including paying take-off fee;

simulating actions of the "enroute" state, including paying enroute fee, based on fuel consumption and reflecting area congestion;

simulating actions of the "landing" state, including disembarking passengers and collecting fares with discount to penalize late arrival.

However, it is an old and well known step in the simulation arts to simulate an event with the aircraft state during which said event occurs. The simulated actions simply reflect real-world practices, and are needed to accurately and completely simulate an airline's operations by monitoring collection and payment of fees (fuel costs, payment from boarding passengers, penalties assessed for late arrival, etc.), and resource usage (airline crew, crew on the tarmac, air traffic, availability of landing runways and arrival gates, etc.). Thus, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the teachings of Niedringhaus to simulation actions performed during specific states in order to accurately simulate the impact each aircraft status state has on the economic state of an airline.

Conclusion

6. This Office action has an attached requirement for information under 37 C.F.R § 1.105. A complete response to this Office action must include a complete response to the attached requirement for information. The time period for reply to the attached requirement coincides with the time period for reply to this Office action.

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Keith Campbell, Wayne Cooper, Daniel Greenbaum, and Leonard Wojcik disclosed in the 3rd USA/Europe Air Traffic Management R & D Seminar a paper entitled "Modeling Distributed Human Decision-Making in Traffic Flow Management Operations" on June 13-16, 2000 (reference 1-V). This paper describes results fro a computer simulation model of Traffic Flow Management operations when weather disrupts airline schedules. The model, named Intelligent agent-based Model for Policy Analysis of Collaborative TFM (IMPACT) is used to model possible "gaming" among airlines. The MITRE CORPORATION developed IMPACT. The IMPACT model allows agent attributes to be changed to represent different airline strategies. IMPACT was used as an open-ended search tool, to find ways to achieve better aggregate economic performance and can be applied to show the range of possible outcomes that result from different strategies.

Dimitri Mavris and Elena Garcia disclosed at the 2000 World Aviation Conference on October 10-12, 2000 a paper entitled "Framework for the assessment of capacity and throughput technologies" (reference 1-W). The paper disclosed the need to simulate airline operations at airports and the authors' review of work being performed at the MITRO Corporation dealing with both airline and air traffic control behavior. The IMPACT model is used to model airlines as agents and places airlines within a system with other agents. The MITRO Corporation has also developed a model named ACSEM (Air Carrier Service Evolution Model) that models airline behavior, including economic conditions, airport capacities, demand and costs, along with a flight schedule. The airline agents within the model have the ability to make changes to their strategies, such as varying fares and schedules, the size of the aircraft flown, and the number of aircraft flown. As the airlines make changes, the flights in the schedule are flown, delays are calculated and translated into costs, and these costs are then balanced with the profits made.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter Choi whose telephone number is (571) 272 6971. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tariq Hafiz can be reached on (571) 272-6729. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Peter Choi
Examiner
Art Unit 3623

PC

September 23, 2005

TARIQ R. HAFIZ
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 3600

37 CFR § 1.105 - Requirement for Information

Request for Additional Information

Applicant and the assignee of this application are required under 37 CFR 1.105 to provide the following information that the examiner has determined is reasonably necessary to the examination of this application.

Niedringhaus' "An Agent-Based Model of the Airline Industry" paper discloses that "ACSEM has its origin in another agent-based airline model, IMPACT, whose focus is more narrow: airline collaborative decision making when weather disrupts schedules".

It has been established that the IMPACT model preceded the ACSEM model. However, the extent to which the IMPACT model absorbed the ACSEM model is unknown. It is unclear whether the ACSEM model evolved from the IMPACT model (completely or partially) or simply shares certain modules of computer programming (simulation of certain events).

The information is required to complete the background description in the disclosure by documenting the level of overlap between the ACSEM and IMPACT

models, and any other preceding agent-based models of airlines or air traffic management.

The information is required to identify products and services embodying the disclosed subject matter of airline simulation and identify the properties of similar products and services found in the prior art.

In response to this requirement, please provide the citation and a copy of each publication that any of the applicants relied upon to develop the disclosed subject matter that describes the applicant's invention, particularly as to developing (ACSEM). For each publication, please provide a concise explanation of the reliance placed on that publication in the development of the disclosed subject matter.

In response to this requirement, please provide the citation and a copy of each publication which any of the applicants authored or co-authored and which describe the disclosed subject matter of airline simulations, especially those disclosing the ACSEM and IMPACT models.

In response to this requirement, please state the specific improvements of the claimed subject matter in claims 1-15 (disclosing the ACSEM model) over prior art (the IMPACT model) and indicate the specific elements in the claimed ACSEM model that provide those improvements. For those claims expressed as means or steps plus

function, please provide the specific page and line numbers within the disclosure that describe the claimed structure and acts.

The applicant is reminded that the reply to this requirement must be made with candor and good faith under 37 CFR 1.56. Where the applicant does not have or cannot readily obtain an item of required information, a statement that the item is unknown or cannot be readily obtained will be accepted as a complete response to the requirement for that item.

This requirement is an attachment of the enclosed Office action. A complete response to the enclosed Office action must include a complete response to this requirement. The time period for reply to this requirement coincides with the time period for reply to the enclosed Office action, which is 3 months.

PC

September 29, 2005

TARIQ R. HAFIZ
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